1957

SPRUCE BUDWORM CONTROL PROJECT

ORGANIZATION AND OPERATING PLAN

FOR

MONTANA

* *

CONTROL AGENCY

United States Department of Agriculture - Forest Service

In Cooperation With

Montana and Idaho State Foresters, USDI - Bureau of Land Management
and Private Land Owners

INTRODUCTION

As early as 1947, the spruce budworm outbreak became a serious threat to Douglas-fir stands on several national forests. By 1948 the infestation had spread to epidemic proportions and has continued to increase in area each year until over three and one-half million acres in Montana and north Idaho are now infested. Much of the infested area has now reached the critical age when tree mortality becomes heavy. Additional sawtimber growth losses this year will approximate 20 million dollars if the epidemic continues at its normal rate of spread and intensity. In addition to sawtimber growth losses each year, many small trees in the understory have been killed. Damages, both tangible and intangible, will increase appreciably over those of each preceding year until the spread and intensity of the epidemic are reduced or controlled by natural and/or artificial means.

Control action was first initiated against the budworm epidemic in 1952, when 12,000 acres were sprayed on the Bitterroot National Forest. In 1953 an additional 133,000 acres were sprayed on the Helena and Nezperce National Forests. The early control projects were not entirely successful, principally because of the policy at that time to spray hotspot areas rather than the entire infested area. As a consequence, much of the acreage in the early spray areas has since become reinfested.

In 1955 and 1956, a more concerted effort was made toward eventual control of the extensive budworm infestation throughout Montana and north Idaho, including the northern part of Yellowstone National Park in Wyoming. Control units were selected and sprayed under a policy of spraying to control the entire infestation within each unit. These units were as follows:

Year	Forest	Unit	Acres
1955	Nezperce	Riggins	66,000
	Gallatin	Gardiner	78,000
		Yellowstone Park	55,000
	Bitterroot	Bitterroot	169,000
		TOTAL	368,000
1956	Lewis & Clark	White Sulphur	254,000
	Helena	Big Belt	154,000
	Deerlodge-Helena	Elkhorn	107,000
		Pioneer	151,000
	Beaverhead	Tobacco Root	100,000
	Lolo	Powell	119,000
		TOTAL	885,000

The 1955 program of 369,000 acres was sprayed at a cost of $1.10 per acre while the 885,000 acres sprayed in 1956 cost $.90 an acre.

Continuation of the concerted control program this year calls for the spraying of an estimated 743,000 acres of infestation in seven entomological control units. Organizing for, and safely and successfully executing a program of this magnitude and complexity, and within the time limit posed by the budworm and climatic conditions, requires the utmost in planning, preparation, precision timing, and teamwork. It is toward accomplishment of this end that the following 1957 budworm control project policies, procedures, and instructions are directed. These should be carefully reviewed and observed by those concerned with the project, especially persons who are directly responsible for its planning and execution.

1957 CONTROL UNITS AND ESTIMATED SPRAY ACREAGE
(As of June 1, 1957)

Spray Unit	National Forest	Spray Acreage	Operating Airstrip
Judith	Lewis & Clark	109,000	White Sulphur Springs
Mill Creek	Gallatin	114,000	Livingston
South Continental	Deerlodge	243,000	Butte
Madison	Beaverhead	86,000	Ennis
Hebgen	Beaverhead	71,000	Missouri Flats
Lima	Beaverhead	70,000	Dell
Yellowstone	Yellowstone Park	50,000	Gardiner
TOTAL		743,000	

PROJECT OBJECTIVE

The 1957 project objective is successful control of the budworm epidemic within the units concerned at reasonable cost and without a serious accident or injury occurring to any equipment or persons connected with or visiting the project.

1957 SPRUCE BUDWORM CONTROL PROGRAM ORGANIZATION AND RESPONSIBILITY ASSIGNMENT CHART

Collaboration

BLM - NPS - Other federal land agencies interested in control program

State For. - F&G Dept. - other interested state agencies

Division of S&PF - S&PF landowner cooperation

Division of I&E - publicity planning & execution

Office of Gen. Counsel - legal requirements

Division of Fiscal Control fiscal requirements

P&S Section - Bids, contracts & service of supply

Division of Range & Wildlife wildlife matters

Division of Fire Control aerial safety requirements & inspection

Div. of E - Aerial mosaic & base-map preparation

Close Collaboration In Respective Fields

Administrative Responsibility

RO Division of Timber Management
E. J. Grambo, Project Director
General administrative responsibilities. Control action planning, organization & execution, current I&E program leadership, safety, inspection of all phases

D. O. Scott - Asst. Project Director
Spray area boundaries, blocks, spray checking & inspection, Coop Aquatic Life Admin. study, S&PF land coop., inspection of entomological work, safety

D. A. Isler - Height of spray flight administrative study & aircraft spray equipment inspection

Forest Supervisor - NF
Control Unit Supervisor
Asst. Unit Supervisor
Unit Biologist
Precontrol program preparations at ground level
S&PF cooperation (as instructed)
On-the-ground direction of control action program
Supervision of safety practices
progress maps, records, reports
Local publicity
Development & mortality checks
Spray deposit checks

Project Operational Personnel
All administrative control functions

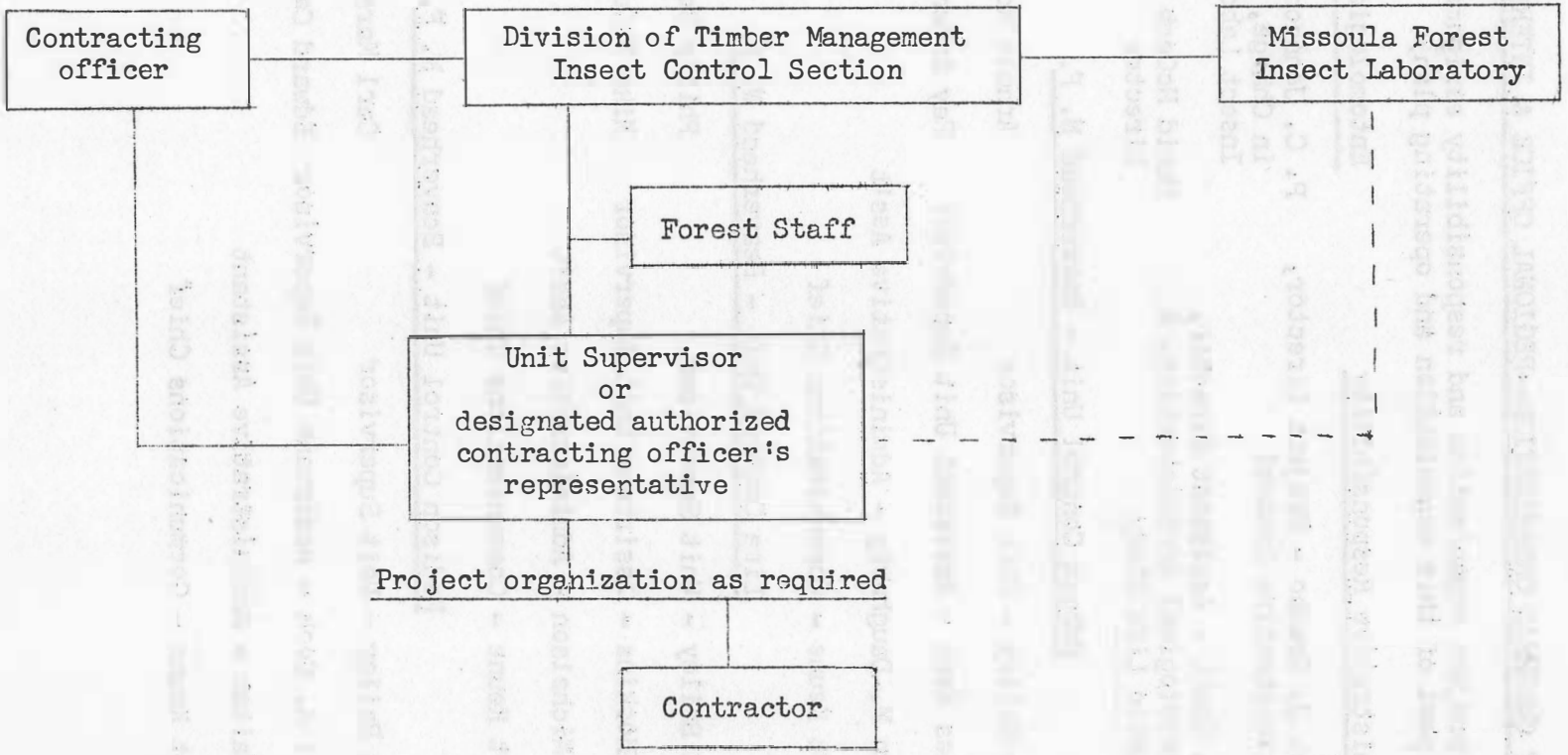
Technical Direction

IF & RES - FIR - Missoula Laboratory
Philip C. Johnson, in charge

Dave McComb - Spruce budworm entomological director
Inspection of entomological aspects of control project

ORGANIZATION CHART

For Operational Phase of 1957 Spruce Budworm Control Project


Contracting officer
Division of Timber Management Insect Control Section
Missoula Forest Insect Laboratory
Forest Staff
Unit Supervisor or designated authorized contracting officer's representative
Project organization as required
Contractor

PROJECT OVERHEAD ORGANIZATION--REGIONAL OFFICE & INTERMOUNTAIN STATION LEVEL

(See project organization and responsibility assignment chart which is a part of this organization and operating plan)

Administrative Responsibility

Ernest J. Grambo - Project Director, Administrative Control

D. O. Scott - Assistant Director, Entomological Administration, & Aquatic Life Study

Entomological Direction

P. C. Johnson - Entomologist in Charge, Missoula Forest Insect Laboratory

David McComb - Entomological Director

Hebgen Control Unit - Beaverhead N. F.

Frank Bailey - Unit Supervisor

Charles Kern - Assistant Unit Supervisor

Gordon M. Daugharty - Administrative Ass't

Robert Keune - Communications Chief

Arnold Royce - Unit Biologist

Ray Schenck - Assistant Unit Biologist

Lima Control Unit - Beaverhead N. F.

Frank Bailey - Unit Supervisor

Paul Hoskins - Assistant Unit Supervisor

Bart Michelson - Administrative Ass't

Robert Keune - Communications Chief

Philip South - Unit Biologist

Mike McCullough - Assistant Biologist

Madison Control Unit - Beaverhead N. F.

Frank Bailey - Unit Supervisor

Robert A. Cook - Assistant Unit Supervisor

Joe Maiten - Administrative Assistant

Robert Keune - Communications Chief

Carl Marsh - Unit Biologist

Edward Carmean - Assistant Biologist

South Continental Control Unit - Deerlodge N. F.

Fred Mass - Unit Supervisor

Calvin Hofferber - Assistant Unit Supervisor

C. A. White - Administrative Ass't

Paul Dickman - Communications Chief

Harvey Rowland - Unit Biologist

Clyde Blake - Assistant Biologist

John Schlegel - Assistant Biologist

William McDonald Assistant Biologist

Mill Creek Control Unit - Gallatin N. F.

William Ibenthal - Unit Supervisor

Donald Nelson - Assistant Supervisor

Donald Jenni - Administrative Ass't

_____ - Communications Chief

William Driver - Unit Biologist

Thomas Thompson - Assistant Biologist

Yellowstone Park - Gallatin N. F.

William Ibenthal - Unit Supervisor

Jack Bennett - Assistant Supervisor

William Driver - Unit Biologist

Arthur Jukkala - Assistant Biologist

Judith Control Unit - Lewis & Clark N. F.

James Watson - Unit Supervisor

Robert Miller - Assistant Supervisor

Ray Pulver - Administrative Ass't

Olaf Haldorson - Communications Chief

Dick McElfresh - Unit Biologist

Bill Ramsey - Assistant Biologist

RESPONSIBILITIES AT VARIOUS ORGANIZATION LEVELS

A. Regional Office

The regional office will retain broad, general administrative responsibilities for and control of the over-all program, including interunit and interagency correlation and cooperation. In addition to these broad administrative control and correlation functions, the regional office will be responsible for the following:

1. State and Private Cooperation. The regional office will obtain the necessary clearances from State Foresters and Forestry Boards for declarations of zones of infestation and other processes under state laws; develop all state and private land cooperative agreements and forms and set up policy and procedure for field guidance, including memoranda of agreement on handling private-owner solicitations, collections, etc. The regional office will be responsible for contacting and obtaining the cooperation of states, Northern Pacific Railway, Anaconda Company and similar large private forest-land owners. Forests will handle or assist the State Forester in handling small-owner cooperation in accordance with special instructions issued for each control unit.

2. Bids and Contracts. All bid solicitations and awarding of contracts for airplane services, insecticide, and heavy construction and/or equipment will be handled by the regional office. Interpretation of the contracts and controversial dis utes with contractor's representatives which cannot be resolved by local project officers will be functions of the regional office. Upon completion of major contractual requirements P&S will prepare vouchers for these major services and forward them to the forest for certification and processing.

P&S will handle all insecticide testing and gallonage measurements for contract compliance and payment purposes.

3. Publicity. The regional office will be responsible for the development of guidelines and correlation of publicity at all levels. They will also endeavor to develop feature articles, photographs, radio scripts, and similar general-purpose items for general dissemination. In addition thereto, spot news items will be developed in outline form so that forests can fill in local statistics and information to apply to each project.

4. Safety and Welfare. The regional office will be responsible for developing specific guidelines and for exerting leadership in aerial safety practices. It will be the responsibility of the regional office to make the initial inspection of the contractor's men and equipment for compliance with aerial safety requirements as included in contract specifications, state, and CAA regulations. Safety must be regarded by all administrative and supervisory personnel as being of highest priority among the control functions.

5. Aerial Photos, Mosaics and Project Forms. The regional office will handle the procurement and preparation of aerial photographs and mosaics for use in conjunction with spraying operations. In addition thereto, the regional office will provide all standardized forms, recording charts, inspection outlines, etc. adopted for universal use among the several control units.

6. Financial Control. Over-all financial planning and allocation of funds will be controlled by the regional office in collaboration with the forests, Forest Insect Laboratory, and the State Forester.

B. Forest Insect Laboratory

The Missoula Forest Insect Laboratory is responsible for developing the procedures, specifications, and instructions for the entomological aspects of the program. The Forest Insect Laboratory is also responsible for the entomological direction of the project, including the preparation of guidelines and assisting in training of unit biologists. Annual, aerial surveys of infestation areas is also a part of Forest Insect Laboratory technical responsibilities. Procedural instructions covering this part of the program have been prepared and presented separately herefrom by the Forest Insect Laboratory. Inspection service will be provided by the entomological director.

C. National Forests

All administrative phases of the budworm control program will be a national forest responsibility. This includes supervision of and responsibility for all infestation area ground survey work, including prespray host-type checking and operational ground surveys of infested areas. Principal national forest administration responsibilities include:

1. Control Unit Boundaries and Spray Blocks. The establishment of control unit boundaries and spray area blocks will be the responsibility of the forest. This will be done jointly by the project supervisor and a member of the regional forester's staff following completion of adequate air and ground survey checking by the forest. Guidelines for establishing spray blocks are 3,000 to 4,000 acres in size, variation of 1,000 feet in elevation, and entire area in one general aspect. The maximum elevational difference must not exceed 1,500 feet.

2. Organization Plan and Budget Estimate. Each forest will be responsible for the development of a control unit organization and operating plan for review with the project director. The forest will be assisted in developing the initial budget estimate for the control unit. Upon review and approval, the forest will be given funds to cover all approved expenditures for force account labor and local contract work such as local plane services, airport construction and maintenance, survey personnel, transportation, administrative help, etc.

3. Area Computations and Master Mosaics. All final area computations will be made on the aerial photo mosaics, using the General Land Office plats for gross basic acreage totals. All computations will be made on the basis of spray acreage within each individual section and these acreages recorded by section, township, and range. This work should be done accurately at the outset so that spray acreaege data arrived at may serve for all future area computations, including spray block acreages, private-owner payments, contract payments, etc. Thereafter, block acreages can be obtained from the initial acreage tabulation forms. Acreage recording forms will be provided by the regional office. Following completion of the initial master mosaic, including the delineation of spray-area boundaries, spray-block boundaries, etc., the unit supervisor concerned will have three additional copies made up as soon as possible for use by the Forest Insect Laboratory, the regional office, and an extra for spray pilot and control operations use.

4. Private-Landowner Cooperation. Every private forest owner within a control unit must be solicited and asked to cooperate in the spray program. For the purpose of soliciting financial cooperation from private landowners, we will use the best infestation and spray area data available at the time solicitation work begins. Small owner-cooperator acreages should be calculated carefully and should be given the benefit of the doubt in doubtful spray areas to avoid controversies or minor adjustments or refunds.

Individual forests will be responsible for soliciting small private-owner cooperation in collaboration with the State Forester as outlined in the memorandum of understanding between the Regional Forester and State Forester. This work should not be undertaken without the knowledge and consent of the State Forester.

5. Facilitating Projects. Ordinarily the forest will be responsible for all facilitating work such as airport and access road construction and maintenance. The regional office will afford such assistance as the forest may need in carrying out this part of the program.

6. Aerial Spraying Operations. Each forest concerned is directly responsible for supervising all local control unit spraying operations. This responsibility includes personal safety and welfare aspects of the entire local operation, including contractor personnel and equipment.

7. Budworm Survey Work. It is of utmost importance that all questionable budworm infestation areas in this year's control program be examined on the ground as soon as travel conditions permit. This work must be given the highest priority for completion so that spray area boundaries and acreage computations can be completed at the earliest possible moment. Any forseen delays in this work which might delay final spray area decisions and acreage computations should be reported to the project director.

The 1957 budworm infestation area ground survey program to be carried on after the spray program is completed will be discussed and outlined with the individual forests concerned at a later date.

A clear-cut understanding of the responsibilities of and relationships between the Forest Insect Laboratory technical director, the insecticide and spray plane contractors, the project direction, and the unit supervisor is most important. As a general rule the unit supervisor will handle all matters of local concern within the local control unit directly with the Forest Insect Laboratory technical director and the contractor's on-the-ground authorized representatives. All matters of interunit concern, such as important technical policy and procedural questions. interunit shifting or assignment of airplanes or project personnel, noncompliance with contract requirements, other major policy or procedure questions, should be referred to the project director at once for action. In order to avoid serious problems and costly delays, it is of utmost importance to any fast-moving project, such as the budworm spraying project, that constant liaison be maintained between the unit supervisor and the project director. Unit supervisors should not hesitate to call on the project director at any time--day or night--for assistance or advice.

Key Points to be Observed in Aerial Spraying of Spruce Budworm

1. Spray planes should fly not less than 100 feet nor more than 400 feet above the treetops except where prudent flying requires flying at elevations greater than 400 feet.

2. Under ideal air conditions the spray will settle downward without sidedrift and without breaks in the spray ribbon. If the spray ribbon is broken frequently and the spray is drifting or showing a vertical turbulence, poor ground coverage will be obtained and spraying operations should therefore be discontinued.

3. Care must be exercised in spraying over or near streams and lakes of sufficient size to support fish. The following guidelines should be observed:

   (a) Spray plane should never make tight turns over a stream or lake without shutting off the spray.

   (b) Spray plane should be one-half the distance of the swath width from the stream or lakeside when surrounding terrain is level to 25 percent sideslope; if sideslope is between 25 and 50 percent, plane should be the distance of one full swath width away from stream or lakeside; if sideslope is between 50 and 75 percent, plane should fly a distance of one and one-half swath width away from stream or lakeside; if sideslopes are over 75 percent, spray plane should fly a distance of two full swath widths away from stream or lakeside.

Spray, after release from the plane, has a tendency to roll downhill, particularly on steep slopes. Thus, it is important that the above guidelines are observed carefully when spraying in any steep terrain if even spray distribution is to be attained on the ground.

4. The spray should be shut off for all turns being made over non-spray areas, including streams and lakes. Spray should also be shut off for all openings and non-spray areas over 20 chains width. This latter includes water, grasslands, brushlands, non-host timber type, farmlands, etc.

5. Spraying will be done during the early morning hours and only when the temperature in the spray areas is below 68 degrees F. and the wind velocity is below 6 miles per hour. Spraying will be stopped in areas when rain is imminent. Spraying will not be started after a rain until at least one hour has elapsed or when the foliage is dry.

8. Transportation, Communication, and Weather Recording Facilities. Each forest will be expected to supply, or otherwise obtain, its own transportation, communication, and weather recording facility needs. The regional office will assist only upon request.

Portable anemometers can be obtained on temporary loan from Fire Control. It will be necessary to purchase the thermometers needed. Anemometers should be returned to Fire Control as soon as the project is completed. They should be requisitioned on a temporary loan basis only.

9. Safety and Welfare. The regional office will be responsible for testing all contract aircraft spray equipment and inspecting all safety features against contract requirements before the aircraft arrives on the project. After initial approval of the aircraft and required safety features by the regional office, it will be the responsibility of the unit supervisor to carry out daily safety inspection and other essential features of the over-all safety program at the ground level.

The policy established last year will be in effect again this year with respect to the marking of powerlines and other similar flying hazards on the master mosaic where they can be shown to the several airplane pilots concerned. This is a unit supervisor responsibility.

The control project organization plan should contain a brief but specific safety plan which is tied in with regional safety policy and procedures, and with the safety requirements set forth in the insecticide and aerial spray contracts.

10. I&E Aspects of the Program. The forest is responsible for handling all local I&E work. The regional office will only handle I&E matters of an interforest nature.

Local I&E work should be pushed aggressively, particularly the use of the Region 1 budworm film and slide sets. All I&E work should emphasize the over-all, long-range budworm problem and deemphasize the spectacular aspects of control work, except as the spectacular aspects of the program may be used as a tool to convey the more pertinent and damaging aspects of the budworm infestation.

11. Administrative Studies. Two administrative studies are planned. These studies will be handled from the regional office entirely except for minimum incidental assistance which the forests may be called upon to afford. Dave Scott and Dick Graham will head up the cooperative aquatic life study by the Forest Service, State Fish and Game Department, Federal Fish and Wildlife Service; and Dave Isler and Joe Davis of the Agriculture Research Service will handle the height-of-spray study which will be conducted at the Missoula airport and on the South Continental Control Unit.

12. Reports, Records, and Maps. The forest is responsible for compiling and maintaining all progress maps, reports, and records required by each control unit operation, including the final project report for the forest control program. Several of the more important items are:

SBW-1 Acreage tabulation record by Sec. T.R.
SBW-2 Aerial observation report
SBW-3 Daily general project safety inspection check list
SBW-4 Daily individual aircraft certification report
SBW-5 Spray period weather record
SBW-6 Daily record of individual spray-plane flights and gallonage
SBW-7 Daily summary of spray-fleet gallonage
SBW-8 Daily report to project director-telephone and written
SBW-9 Spray-block gallonage record
SBW-10 Spray--block acceptance and approval record
SBW-11 Insecticide inventory record and delivery waybills
SBW-12 Record of observation plane flights
SBW-13 Daily log record of over-all activities, including record of messages, telephone, and radio calls of importance
SBW-14 Pilot, spray and observation aircraft inspection
SBW-15 Spruce budworm infestation check sheet
SBW-17 Budworm checkers daily report
SBW-18 Daily budworm larval development record
SBW-19 Spruce budworm development plot data
Current organization and responsibility assignment chart
Up-to-date instructions, including contract requirements, pertinent to current project operations
Other normal payroll, report, and accounting records pertinent to the project

DUTIES AND RESPONSIBILITIES OF INDIVIDUAL POSITION ASSIGNMENTS

Following is a brief outline of the more important individual duties and responsibilities of the key positions in the budworm control project organization:

Project Director. Responsible for overall supervision of the entire spruce budworm program, including the several individual control units. Coordinates the work between units, between cooperators, between contractors, and between the several Government agencies concerned. Safety and welfare are an integral part of the director's overall responsibilities.

Entomological Director. He will prepare guidelines for the entomological phases of the control program and assist in the training of technical personnel. The entomological director should collaborate closely with the unit supervisor and the assistant project director who is administratively responsible for technical operations.

Assistant Project Director (Technical) is primarily responsible to the project director for the administrative aspects of all technical and entomological work connected with the control program, including spray area delineation, spray block boundaries, insect development checking, spray deposit checking, and postmortality checking. This position also carries the responsibility for the conduct of the cooperative aquatic life study with the State Fish and Game Department and Federal Fish and Wildlife Service. In case of necessity in order to avoid delays in the control program, the assistant project director will act for the director when the latter is not available for counsel.

Control Unit Supervisors will be responsible for and fully authorized to conduct all general administrative phases of the unit control program to which assigned. They will be given full authority for making all necessary on-the-ground decisions which are vital to the successful prosecution of an emergency program such as the budworm control project. Unit supervisors are the authorized representatives of the contracting officer and as such will, with the assistance of the regional contracting officer, carry the full responsibility of obtaining contract compliance. They will maintain constant communication and liaison with the project director at all times when spray operations are underway. A most important and integral part of the unit supervisor's responsibility is the safety and welfare of all personnel and equipment assigned to the project, including that of contractors.

Assistant Unit Supervisor. The principal purpose of this position is to divide the workload of the unit supervisor so as to avoid fatigue, both mental and physical, during the active spray program. The assistant unit supervisor on each control unit will be directly responsible to the unit supervisor for carrying out the duties and responsibilities assigned to him during his scheduled tour of duty.

The control unit organization chart and responsibility assignment plan should clearly define the division of duties between the unit supervisor and the assistant unit supervisor. Ordinarily, aerial inspection of spraying operations will be assigned entirely to one or the other of the two positions.

Unit Biologist. Unit biologists are a part of the regular unit control organization and as such are administratively responsible to the unit supervisor. With the guidance of the technical director, unit biologists will train and supervise the insect development checkers, the spray deposit checkers, and the premortality checkers. They will at all times work in close collaboration with the unit supervisor to whom they will serve as technical and entomological advisors.

Assistant Unit Biologist. This position's primary purpose is to relieve the unit biologist of the development checker's transportation problems and to check spray areas that are reported as unsatisfactory. He may be assigned other duties as required, but all duties should be clearly defined in writing.

Insect Development and Spray Deposit Checkers. These positions will comprise the technical field organization which will be supervised by the unit biologist and upon which the biologist and the unit supervisor depend for information with which to guide spraying operations. Like the unit biologist, men assigned to these positions are also a part of the overall administrative control organization. Close collaboration in the assignment of these men is therefore required by the unit biologist and the unit supervisor in order that the greatest amount of overall good can be gained from their work.

Unit Administrative Assistant. This position carries with it the responsibility for maintaining all the essential reports and records required by the control operation. The most desirable candidate for this position is the assistant administrative assistant from the local forest concerned. The project administrative assistant serves as office manager and accountant for the unit supervisor.

Communications Chief. The duties of this position are somewhat limited but exceedingly important. The principal responsibility of the communications chief is to see that the going spray project is in constant communication where and when needed. In some instances other duties may be assigned to this position such as those of acting as one of the mobile weathermen.

Aerial Observer. One aerial observer will be assigned to each spray unit. He will be directly responsible to the unit supervisor. He will stay aloft while spray planes are in the air and keep adequate notes on block, date, time, weather, height above trees, pilot, etc. He will observe compliance of flying instructions issued by unit supervisor and report on all unsatisfactory jobs.

1957 BUDWORM CONTROL PROJECT SAFETY PLAN

This safety plan and policy is applicable to both Forest Service and contractor operations. Each employee of the Government and the contractor should understand the safety plan and must be impressed with the fact that he has a responsibility in the prevention of accidents.

The objective of this plan is to carry out the spruce budworm program with no fatalities, no lost-time injuries, and no property damage accidents in either the Forest Service or contractor's organizations, or among the general public.

The contracts for aerial spraying and insecticide include numerous safety provisions to safeguard this hazardous operation. In addition, it has been found by experience that some additional safety rules are necessary to keep the project running smoothly. This plan includes all of these safety provisions for the convenience of those responsible for enforcement.

A. Safety Provisions in the Aerial Spraying Contract.

1. All planes and pilots shall fully comply with applicable CAA regulations and any pertinent regulations of the State of Montana. Planes must be registered with the Montana Aeronautics Commission and proper display of the registration plaque is necessary. Planes and pilots will be grounded for violation of these requirements.

2. All planes shall be clean inside and out. No plane may be used for spraying which has not been approved by the regional air safety officer or his designated representative.

3. The maximum allowable insecticide spray load for each airplane will be based on the CAA certificated gross weight for the airplane concerned as modified by the regional air safety officer and project director to meet local airport runway and flying conditions of the control unit concerned.

4. Each observation plane will have front seats equipped with CAA approved shoulder harness and all seats will be provided with CAA approved single, individual seat belts. They shall have quick detachable fittings and shall be attached to a substantial part of the structure of the aircraft whenever attachment to the seat does not give the required strength.

5. Each observation plane will have sufficient parachutes to equip the pilot and all passengers. Chutes shall be certified CAA approved and maintained and packed strictly in accordance with CAA regulations. Proper fitting of harness and briefing as to use will be a part of this requirement. All pilots and passengers will wear parachutes while planes are being operated in the performance of this contract.

6. All spray aircraft shall be equipped with approved shoulder harness and safety belts (see "4" above).

7. Spray pilots shall properly use shoulder harness, safety belts, and crash helmets while planes are being operated in the performance of this contract. Pilots of single-engine planes must wear parachutes unless specific waiver is granted by the regional air safety officer and the project director jointly. Such a waiver must be set forth in a joint memorandum.

8. Gasoline tanks, as well as insecticide tanks, shall be plainly marked, or so designated as to avoid all danger of confusion when loading gasoline and insecticide. Red shall be used for gasoline and green for insecticide. Filler necks and vents shall be of such design and size as to permit rapid filling of tanks and to prevent spillage from surging.

9. Leakproof insecticide tanks and covers with exterior inlets and easily discernible green inlet and cap markings, and the word "spray" shall appear beside the filler neck in legible letters and contrasting color.

10. The spray system shall have positive action, leakproof, shut-off valves capable of eliminating drool at the nozzles or clusters of nozzles.

11. All aircraft and refueling equipment will be electrically grounded while refueling - important.

12. A minimum of thirty (30) minutes reserve supply of gasoline over the estimated amount needed for the round trip will be required for each flight. This will be determined by actual measurement.

13. A line inspection will be performed by a properly certified and rated mechanic each day on each airplane flown. These inspections shall be certified on line inspection forms to be kept for the duration of the project.

14. Aircraft windshields will be kept clean.

15. No spray pilot will be permitted to pilot an airplane for more than 5 hours on any one day, and shall not serve as a pilot for more than 6 days in succession, one hour or over of flying time will constitute a spray day. Refueling and spray loading may be deleted from the 5 hours.

16. No spraying will be done in late afternoon or evening.

17. The unit supervisor has the right to ground pilots or airplanes which, in his opinion, violate contract rules, are unsafe, or otherwise unsatisfactory, in which event the contractor will be required within a reasonable time, specified by the unit supervisor, to correct such deficiencies. Excessive drinking on the part of any pilot will be considered a violation of normally accepted safe practices and will be considered as sufficient grounds for his disqualification.

18. The plane contractor will furnish 15-point carbon dioxide fire extinguishers, or acceptable equivalent type at each of the following locations:

* One at each gasoline loading station when operating.

* One in the area where daily maintenance work is carried on.

* One for each three planes or fraction thereof where and when the planes are parked.

  Two in the emergency truck for quick transportation to any fire on the airstrip.

* These extinguishers are interchangeable as center of operation moves from one point to the other.

19. The plane contractor will provide one light panel delivery truck or station wagon to be used as an ambulance and emergency car which will be equipped with:

2 fire extinguishers as indicated above
1 stretcher of approved type
2 blankets
1 approved 10-25-man first aid kit
Emergency tools such as hacksaws, pry bars, bolt cutters, etc., for extracting personnel from wreckage.

20. The plane contractor will furnish an Aldis traffic control lamp for each operating airfield. The contractor will also assign an airport traffic control officer if requested by the unit supervisor. Ordinarily this will not be required unless the number of planes in use makes such measures desirable.

21. The contractor, or any of his subcontractors, will use due diligence in preventing accidents and will comply with applicable provision of Federal and State laws and regulations. The contractor will maintain a record of all cases of death, injury, or disease arising out of or in the case of employment or work under the contract. This record will be available upon call of the unit supervisor.

B. Safety Provisions in the Insecticide Contract.

22. The insecticide contractor will be required to provide and maintain in constant usable condition at each designated airport, the following facilities for prevention and suppression of fires:

a. At least one 15 point CO^2 extinguisher at each pu ping unit installed.

b. At least one 15 pound CO^2 extinguisher for each nozzle outlet of each airplane insecticide loading station.

C. General Project Safety Rules.

23. The chief pilot must brief all of his pilots on the local airport traffic pattern. If there is no established pattern, he should work up a pattern subject to the approval of the unit supervisor.

24. The unit supervisor will establish and maintain a check-in system on flights to assure prompt followup in event of overdue planes.

25. In the event of a plane accident away from a road, the unit supervisor will immediately call for the services of the regional air rescue squad from the aerial fire depot. Call should be placed with the regional fire dispatcher. Also, notify project director and regional serious accident committee at once. This action should not deter any local effort to reach the accident scene in the shortest possible time and with the best available medical and other appropriate facilities.

26. The unit supervisor will be especially alert to prevent overloading of observation planes. The effect of altitude and temperature on aircraft performance are often not recognized or adequately compensated for, even by fliers of long experience. For example, with an airport temperature of 70 degrees and pressure altitude of 5,000 feet, rate of climb is reduced to about 42 percent, and takeoff distance requirement more than doubled as compared with standard sea level performance. As a rough rule of thumb for light, single-engine planes on low level flight over rugged terrain, limit the loading to 50 percent of rated sea level capacity - for the Cessna 180, with rated useful load of 1,090 pounds, a pay load of about 550 pounds with full tanks. This means a limit of pilot and two passengers on observation flying with temperature below 70°, and pilot and one passenger only if temperature is very much above 70°.

27. Very early morning spraying operations make it desirable that men off duty during daylight hours get rest or sleep in late afternoon or early evening.

28. Adequate safe lighting should be provided for loading, maintenance, and headquarters area.

29. Hot coffee should be available at airstrips to promote alertness in the early morning hours.

30. Separate quarters should be provided at airport for (1) unit supervisor's office, mosaics, etc. (2) coffee and loafing room, (3) biologist and insect crew, if headquartered at airport.

31. Unit supervisors will maintain close working relationships with contractors' authorized representatives in order to avoid air-strip accidents. Plans will be made and adhered to for the elimination of all unsafe practices and accident hazards.

32. Insecticide, gas, and oil storage tanks should be located so that frequent crossing of the airstrip by vehicles or individuals will not be necessary.

33. Restricted (no smoking) areas will be designated and signed and strictly enforced.

34. Provide car parking for spray organization and for general public.

35. Provide adequate sanitation, including latrine, if operating quarters are any distance from established airport facilities.

36. Transmission and powerlines and other such hazards will be shown in a distinctive red symbol on all master mosaics and flying maps. When such hazards are pointed out to the pilots, it should be explained that the Forest Service does not claim them to be all the hazards in the area. The chief pilot and spray pilot must take the responsibility for locating and identifying all special hazards.

37. All pertinent instructions contained in the Forest Service Safety Code are made a part of this plan and will be enforced by administrative and supervisory personnel. The project director and regional air safety officer are responsible for safety matters at the regional level. Unit supervisors and unit biologists are responsible for all safety matters at the control unit levels.

D. Supplemental Safety Instructions for Forest Service Employees.

38. Protective clothing, gloves, and goggles should be worn by personnel handling or working around insecticide. This also applies to contractor employees.

39. Watch insecticide handlers carefully for susceptibility to DDT.

40. Checkers and other fiel men shall wear logger-type shoes with nonskid soles and snag-resistant shirts and trousers.

41. All checkers must be adequately briefed on getting to and from their work area to eliminate any possibility of becoming lost.

42. Checkers shall carry: first aid kit, compass (depending on local conditions), matches, and a pocket knife or belt axe. Snake bite kits should be carried in snake country.

43. Watch your step!! Rocky slopes and steep country are treacherous

44. Always be on guard against injury from falling trees, snags, limbs, rolling logs, or rocks. If you hear a rolling rock, log or tree, don't run blindly. Determine its falling direction, then get in the clear.

45. In case you are injured and alone, keep calm. Stay where you are; clear an area to mineral soil and build a signal fire using green boughs for smoke. Someone will find you.

46. Particular emphasis will be given to automotive equipment and driving safety requirements as set forth in the Forest Service safety code. All persons responsible for the operation of a motor vehicle will be given a thorough drivers' checkup and special vehicle operating precautions.

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SAFETY IS EVERYBODY'S BUSINESS AND INDIVIDUAL RESPONSIBILITY

MAY NOT BE DELEGATED. DO IT THE SAFE WAY !